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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,795	07/30/2003	Nickolaos Pilatis	84800 3017 KAW	9410
20736 7590 08/14/2007 MANELLI DENISON & SELTER 2000 M STREET NW SUITE 700 WASHINGTON, DC 20036-3307			EXAMINER KIM, TAE JUN	
			ART UNIT 3746	PAPER NUMBER
			MAIL DATE 08/14/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/629,795

Applicant(s)

PILATIS ET AL.

Examiner

Ted Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18, 20 and 22 is/are pending in the application.
- 4a) Of the above claim(s) 4, 6, 11-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-5, 7-10, 17, 18, 20 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/04/2007 has been entered.

### ***Response to Amendment***

2. The amendment filed 06/04/2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the deletion of the "prior art" aspects of Fig. 2 would constitute new matter.

Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless—

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 8, 10, 17, 18, 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Killmeyer et al (2,152,057). Killmeyer et al teach a fuel injection arrangement including a prefilmer (see Fig. 5) comprising an annular member 36 having radially inner and radially outer fluid flow surfaces with a flow passage therebetween (see 13 in Fig. 1) and with a fuel supply 38 for supplying a liquid fuel to said flow passage, said flow passage having an exit opening 39 into a passage receiving, in operation, an air flow from a source 14 upstream of said exit opening, said passage having a downstream edge 39, 40 and a surface (inside of 36) over which fuel flows in use, the prefilmer being arranged so that when working in operative association with the fuel injection arrangement fuel flows over said surface to said downstream edge 39, 40, from where the fuel is shed (see page 2, 2<sup>nd</sup> col., lines 49+), and air flows radially inwardly and radially outwardly of the prefilmer (see Fig. 1, where air flows outside of 13) characterised in that the prefilmer further comprises a fluid flow mixing means 39, 40 disposed on the surface over which the fuel flows to enhance the mixing of fuel and air; characterised in that the fluid flow mixing means comprises projections extending generally downstream from the downstream edge; characterised in that the projections are radially outwardly angled; characterised in that the angle of the projections is between 0 and 45 degrees relative to an injector axis; characterised in that the prefilmer is generally annular; characterised in that the surface is an inner surface of the prefilmer and the fluid flow mixing means is disposed to the inner surface; characterised in that during

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low fuel flows the fluid flow mixing means inherently enhances the mixing of fuel and air and provide regions of rich and lean fuel/air mixtures.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-5, 7-10, 17, 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Killmeyer et al (2,152,057) in view of either Young et al (3,153,319) or Joshi et al (5,638,682). Killmeyer et al teach various aspects of the claimed invention but do not teach the projections are trapezoidal, have trapezoidal notches, or are radially inwardly and outwardly angled. Young et al teach that it is well known to employ projections that are trapezoidal (see Fig. 7) with trapezoidal notches or radially inwardly and outwardly angled (see Fig. 12), where the projections are used to modify the boundary and increase the mixing between the inner and outer streams (col. 2, lines 52-60) in an analogous fashion to the claimed invention. Joshi et al '682, in combination with the incorporated by reference (see col. 2, lines 45-48; col. 3, lines 13-17) Joshi et al 5,251,447 patent teach the prefilmer arranged so that when working in operative association with the fuel injection arrangement fuel from 65 (see the Joshi '447 patent and note that the fuel is liquid) flows over the surface to the downstream edge, from

where the fuel is shed, characterised in that the prefilmer further comprises a fluid flow mixing means (slots 70 or the portions of 36 between the slots) to, in use, enhance the mixing of fuel and air; characterised in that the fluid flow mixing means comprises projections (the portions between the slots) extending generally downstream from the downstream edge; characterised in that the projections are generally trapezoidal in shape (see e.g. Figs. 4, 5). It would have been obvious to one of ordinary skill in the art to employ trapezoidal projections or notches and incline the projections radially inwardly and outwardly angled, as taught by either Young et al or Joshi et al, in order to use an equivalent projection configuration and/or increase the mixing.

7. Claims 1, 2, 8, 10, 17, 18, 20, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shekleton (4,470,262) in view of Killmeyer et al (2,152,057).

Shekleton teaches a prefilmer for a fuel injection arrangement (see e.g. Figs. 4, 7) comprising an annular member 206 having radially inner 216 and radially outer 214 fluid flow surfaces and a downstream edge near 216, the prefilmer being arranged so that when working in operative association with the fuel injection arrangement fuel flows over one of the surfaces to the downstream edge near 216, from where the fuel is shed, and air flows through 210 and e.g. 222 radially inwardly and radially outwardly of the prefilmer. Shekleton do not teach the use of a flow mixing means disposed on the surface on which the fuel flows. Killmeyer et al teach a fuel injection arrangement including a prefilmer (see Fig. 5) comprising an annular member 36 having radially inner and radially outer fluid flow surfaces with a flow passage therebetween (see 13 in Fig. 1) and with a fuel

supply 38 for supplying a liquid fuel to said flow passage, said flow passage having an exit opening 39 into a passage receiving, in operation, an air flow from a source 14 upstream of said exit opening, said passage having a downstream edge 39, 40 and a surface (inside of 36) over which fuel flows in use, the prefilmer being arranged so that when working in operative association with the fuel injection arrangement fuel flows over said surface to said downstream edge 39, 40, from where the fuel is shed (see page 2, 2<sup>nd</sup> col., lines 49+), and air flows radially inwardly and radially outwardly of the prefilmer (see Fig. 1, where air flows outside of 13) characterised in that the prefilmer further comprises a fluid flow mixing means 39, 40 disposed on the surface over which the fuel flows to enhance the mixing of fuel and air; characterised in that the fluid flow mixing means comprises projections extending generally downstream from the downstream edge; characterised in that the projections are radially outwardly angled; characterised in that the angle of the projections is between 0 and 45 degrees relative to an injector axis; characterised in that the prefilmer is generally annular; characterised in that the surface is an inner surface of the prefilmer and the fluid flow mixing means is disposed to the inner surface; characterised in that during low fuel flows the fluid flow mixing means inherently enhances the mixing of fuel and air and provide regions of rich and lean fuel/air mixtures. It would have been obvious to one of ordinary skill in the art to employ the projections of Killmeyer with the downstream end of Shekelton, as taught by Killmeyer, to increase the mixing of the liquid film with the air around the annulus.

8. Claims 1, 3-5, 7-10, 17, 18, 20, 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Shekleton (4,470,262) in view of Killmeyer et al (2,152,057), as applied above, and further in view of either Young et al (3,153,319) or Joshi et al (5,638,682). The Shekelteon combination teaches various aspects of the claimed invention but do not teach the projections are trapezoidal, have trapezoidal notches, or are radially inwardly and outwardly angled. Young et al teach that it is well known to employ projections that are trapezoidal (see Fig. 7) with trapezoidal notches or radially inwardly and outwardly angled (see Fig. 12), where the projections are used to modify the boundary and increase the mixing between the inner and outer streams (col. 2, lines 52-60) in an analogous fashion to the claimed invention. Joshi et al '682, in combination with the incorporated by reference (see col. 2, lines 45-48; col. 3, lines 13-17) Joshi et al 5,251,447 patent teach the prefilmer arranged so that when working in operative association with the fuel injection arrangement fuel from 65 (see the Joshi '447 patent and note that the fuel is liquid) flows over the surface to the downstream edge, from where the fuel is shed, characterised in that the prefilmer further comprises a fluid flow mixing means (slots 70 or the portions of 36 between the slots) to, in use, enhance the mixing of fuel and air; characterised in that the fluid flow mixing means comprises projections (the portions between the slots) extending generally downstream from the downstream edge; characterised in that the projections are generally trapezoidal in shape (see e.g. Figs. 4, 5). It would have been obvious to one of ordinary skill in the art to employ trapezoidal projections or notches and incline the projections radially inwardly



and outwardly angled, as taught by either Young et al or Joshi et al, in order to use an equivalent projection configuration and/or increase the mixing.

### ***Response to Arguments***

9. Applicant's amended claims filed 06/04/2007 amend around the rejections previously applied.
10. Applicant's arguments of 06/04/2007 with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached at 571-272-4828. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the

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Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>

  
/Ted Kim/

Primary Examiner

July 25, 2007

Technology Center 3700

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